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(56) Documents cited

GB 2134009 A

GB 1264135 A

GB 1228668 A

GB 1133604 A

(58) Field of search

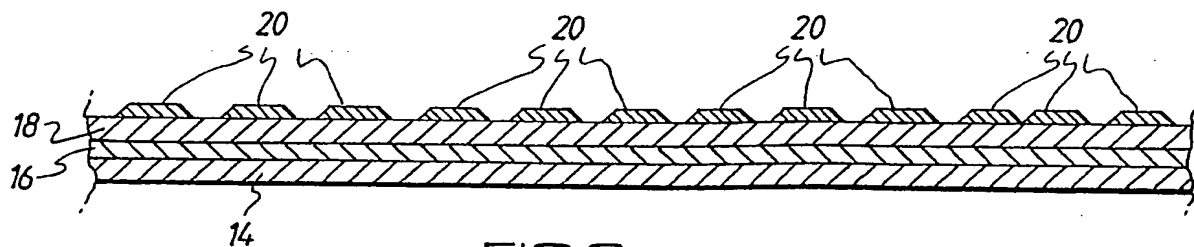
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(54) Printed substrates having relief surfaces

(57) A layer of varnish is applied to a printed surface and a second layer of material is applied on top which is an intermittent layer thereby providing a tactile effect in addition to a visual effect. Furthermore the second layer of material can be applied to the substrate such that the area of application matches a particular element depicted by the layer of print which will remain viewable through the layers applied thereto.



Improvements Relating to Printing of Substrates

This invention relates to the printing of substrates and the method by which a surface of variable relief is produced. In particular, but not exclusively the invention relates to carton blanks which are typically formed of substrate material and in a form such that when constructed they form packaging for goods. Said cartons typically have printed matter on the external surface thereof and layers of varnish thereover. This invention specifically relates to the provision of an additional layer of material which may only partially cover the previous layer on the carton blank. The application and form of this additional layer is controlled such that the shape and form of the layer will meet the customers requirements.

Carton blanks in their constructed form are used extensively to package goods of many differing forms but typically consumer goods and foods and drink. The said cartons are manufactured initially in blanks of the material such as card. To enhance the visual impact of the carton when formed and hence the product therein the external surface of the carton has printed thereon details of the product and associated pictures, emblems, trade marks and any other logo. In an attempt to gain competitive advantage in carton manufacture and also to improve the visibility and impact of the cartons external surface manufacturers constantly search for new types of external carton appearance. One type of external surface involves the creation of an embossed effect on the surface wherein an emblem or such like is provided on the surface in a different colour and on a raised surface. This improves both the appearance and tactile effect of the external surface of the carton. This effect is produced by what is called a Thermographic process. In this process the colour print is applied as normal to the board. A layer of

wet ink is then printed onto the colour print in the configuration required for the emblem. In the next stage, coloured powder is passed over the surface with the effect that the powder sticks to the wet ink. The excess powder is then dusted off and the board is placed in the oven at a set temperature and constant humidity. This has the effect of melting the powder into the configuration of the wet ink and subsequently setting this emblem to the card.

Although this system does provide the required distinctive finish there are several disadvantages which have been found with this process. The humidity of the oven used to melt the powder is critical in that it has to be controlled to ensure that the properties of the board remained constant. As a result of this and the process as a whole the stability of the board during the process is doubtful. Limitations also exist in the size of board which can be used in the process. As a result of the close control parameters required to be maintained to ensure that the board remains in the required state, relatively expensive and complex machinery is required.

The aim of the present invention is to provide means whereby there may be provided on the external surface of the board a tactile effect whereby the said tactile effect is provided by an overlay of a layer of material. The said overlay is controllable such that various designs, emblems and lettering may be reproduced.

The present invention provides in a first aspect a substrate with a surface which is to be viewed; protective translucent varnish layer covering said surface; decorative and tactile printed relief layer on the varnish of sufficient translucency to enable the surface to remain viewable.

The present invention in a second aspect provides a substrate having at least one printed layer of material applied thereto to produce a visual and tactile effect wherein said layer is applied to the board only in those areas required to produce a raised design on the board.

In a more specific aspect the invention provides that said substrate is to be cut into carton blanks.

Preferably said tactile layer of material applied to the board is a varnish. Said varnish typically will be a gloss varnish.

In another aspect the invention provides a method of producing a board with a raised design thereon wherein there is applied to the board colour print by conventional means followed by a first layer of varnish on top, said varnish and print allowed to dry before having applied thereto a second layer of varnish only in those places required to produce the decorative and/or tactile effect on the board.

Typically said first layer of varnish is a refusable varnish with a matt finish.

Preferably, said colour print and first coat of varnish is dried by ultra violet light.

Preferably, the second layer of varnish is dried over a controlled time period by ultra violet light to prevent said varnish from being rejected by the first varnish layer.

The second layer of varnish is of sufficient viscosity such that it largely stays in position when applied and hence maintains a bond with the first layer of varnish.

The second layer of varnish preferably is of a viscosity that ensures that when applied to the first layer of varnish, any expansion takes place equally unidirectionally.

Typically the expansion of the second layer of varnish is such that when the varnish dries, the boundary of the varnish returns to the original dimensions and surface tension causes raising of the varnish.

The viscosity of the second layer of varnish is controlled such that the amount of expansion of the varnish upon application can be calculated and taken into account in the production of the printing plate.

Preferably, the second layer of varnish is of sufficient flexibility to ensure that the varnish does not flake off during any flexing of the board.

Preferably, the printing plate which is used is a relief plate as used to apply varnish, said plate having the required design formed therein.

This second layer of varnish may define emblems, lettering, logos and repetitive designs or any combination of same.

Where applied, the second layer of varnish provides a tactile effect on the external surface to which the varnish is applied.

Preferably the second layer of varnish is applied to areas of the printed board to produce a textured effect in association with the printed information.

Typically, the overall time to produce a finished carton as in the present invention is not greater than for a

conventional carton.

Preferably, the second layer of varnish is applied using conventional printing machinery.

Preferably, said second layer of varnish shall be applied during a normal printing process.

An embodiment of the invention shall now be described and with reference to the accompanying figures wherein:

Figure 1 shows a plan view of a carton blank with a design applied to the external surface thereof,

Figure 2 illustrates an enlarged sectional end elevation of the carton blank on line AA of Figure 1;

Figure 3 illustrates the method of application of the various layers of material to form the relief effect on the external surface of the invention; and

Figure 4 illustrates the reaction of the second layer of varnish upon application.

Referring firstly to Figure 1 there is shown a carton blank 2 with a layer of colour print, a first layer of varnish and a second layer of varnish thereon. The second layer of varnish is applied intermittently to produce a raised effect on those areas where applied. The application can be in strips 6, in a pattern 8, or lettering 10, all of which may be applied in a repetitive pattern 12.

Figure 2 represents a cross section through the carton blank of Figure 1 and represents a section through any board as in the invention. There is shown the board 14 having applied

thereto a layer of colour print 16 and a first layer of varnish 18 by conventional methods. To the first layer of varnish there is applied at designated areas a second layer of varnish 20 to produce the tactile raised effect 4 on the external surface of the board. Each layer bonds together upon drying such that they are fixed to the board.

Figure 3 illustrates the process involved in producing the coated board. The board 14 passes through a print coating device 22 which serves to apply the colour print to the board 14. Typically the colour print will include the name and some form of design relating to the goods to be contained within the carton when constructed. The board then passes under ultra violet light 24 to partially dry the wet colour print before passing through the applicator 26 for the first matt varnish layer. Upon application the board again passes under ultra violet light 24 such that the varnish and colour print may be more fully dried. The board is then transferred 27 to a second printing machine wherein the second partial layer 20 of gloss varnish is applied by applicator 28 to the required areas of the board and then dried for a controlled time by ultra violet light 24 to ensure that the second layer 20 does not expand from the areas to which it has been applied.

The method of application is therefore as described with reference to Figure 3. It is critical to the success of the application that the viscosity of the second layer gloss varnish 20 is such that upon application to the first layer 18, the initial expansion which occurs and is shown in Figure 4 is prevented to a large extent. The first layer of varnish 18 is refusable in that it does not encourage bonding thereto. The second layer when applied as shown by the lines 30 expands upon contact with first layer 18. The viscosity of the gloss varnish 20 is such that the initial expansion is unidirectional as shown by broken lines 32. Controlled drying

prevents further expansion and results in the area of application returning to lines 30. The gloss varnish 20 is also flexible when dry to ensure that any flexing of the board does not result in the flaking of the gloss varnish 20 from the first layer of varnish 18.

The advantages of this method are numerous, however the main advantage is the provision of a method whereby the tactile, visual and decorative effect on the carton is greatly improved, representing a considerable advantage over conventional cartons. Of those methods for providing a tactile effect currently used all require specialised machinery and complex control systems which make the production of cartons by these methods relatively expensive. This has led to cartons produced using these methods being limited to those for expensive luxury goods. The production of an enhanced tactile, visual and decorative effect as in this invention can be performed without considerable expense thereby allowing cartons for non luxury items to be produced. Furthermore the current invention allows the tactile effect to be produced at normal printing speed and on a normal printing process.

CLAIMS

1. A substrate with at least one surface which is to be viewed having a protective translucent varnish layer covering said surface characterised in that there is provided a decorative and tactile printed relief layer on the varnish of sufficient translucency to enable the surface to remain viewable.
2. A substrate with at least one surface which is to be viewed said surface having applied thereto a printed layer of material to produce a visual and tactile effect characterised in that said layer is applied to the board only in those areas required to produce a raised design on the surface.
3. A printed relief layer as in Claim 1 characterised in that said layer is a layer of varnish.
4. A printed relief layer as in Claim 1 characterised in that the layer has a viscosity which ensures that when applied to the first layer of varnish, any expansion which occurs takes place equally unidirectionally.
5. A decorative and tactile printed relief layer as in Claim 1 characterised in that a layer of varnish of sufficient viscosity such that the varnish remains in position when applied and maintains a bond with the first layer of varnish.
6. A printed relief layer as in Claim 5 characterised in that expansion of the said layer is such that when dry, the boundaries of the layer return to the original dimension of the applied layer and surface tension causes the varnish to raise.
7. A printed relief layer as in Claim 5 characterised in

that the viscosity of said layer is controlled such that allowance can be made for the expansion of the varnish upon application.

8. A printed relief layer as in Claim 3 characterised in that said varnish is a gloss varnish.

9. A printed relief layer as in the preceding claims characterised in that the varnish is of sufficient flexibility to ensure that the varnish does not flake off, during flexing of the substrate.

10. A substrate as in Claim 1 characterised in that said substrate is to be cut into carton blanks.

11. A protective translucent varnish layer as in Claim 1 characterised in that said varnish is a refusable varnish with a matt finish.

12. A decorative and tactile printed relief layer as in Claim 1 characterised in that said layer may define emblems, lettering, logos and repetitive designs or any combination of same.

13. A decorative and tactile printed relief layer as in Claim 1 characterised in that said layer, where applied, will provide a tactile and textured effect in association with information printed on said substrate.

14. A method for producing a substrate with a raised design printed thereon characterised in that there is provided a substrate upon which is applied a layer of colour print by conventional means followed by a first layer of varnish applied thereto; said varnish and print allowed to dry prior to the application of a second intermittent layer of varnish

to provide a decorative and/or tactile effect on the substrate.

15. A method as in Claim 14 characterised in that said second layer of varnish is applied only in predesignated areas to provide a tactile emblem, logo, repetitive pattern or any combination thereof.

16. A method as in Claim 14 characterised in that said printing plate which is used to print the said second layer of varnish will be a relief plate applicator, having the required design formed thereon.

17. A method as in Claim 14 characterised in that colour print layer and first layer of varnish are dried by ultra violet light.

18. A method as in Claim 14 characterised in that the second layer of varnish is dried over a controlled time period to prevent said varnish from being rejected by the first varnish layer.

19. A drying method as in Claim 18 characterised in that said drying is performed by ultraviolet light.

20. A substrate to which is applied at least one printed layer of material to produce a visual and tactile effect thereon characterised in that said layer is applied to the substrate only in predesignated areas to produce the required raised design.

21. A method of applying a tactile printed relief layer on a substrate substantially as herein described with reference to the accompanying description and drawings.

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22. Apparatus for the application of a tactile printed relief layer on a substrate substantially as herein described with reference to the accompanying description and drawings.

Examiner's report to the Comptroller under
Section 17 (The Search Report)

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Relevant Technical fields

(i) UK CI (Edition L) B2E (ECD:EFD:EM:EN:EQ)
B6C (CSD:CSAB)

(ii) Int CI (Edition 5) B05D

Search Examiner

V V BAILEY-WOOD

Date of Search

17 DECEMBER 1992

Databases (see over)

(i) UK Patent Office

(ii)

Documents considered relevant following a search in respect of claims 1-21

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB A 2134009 (ARMSTRONG)	1
A	GB 1264135 (FOSTER PLASTICS)	1
A	GB 1228668 (EIDAI SANGYO)	1
A	GB 1133604 (JOHN L ARMITAGE)	1

Category	Identity of document and relevant passages	Relevant to claim(s).

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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